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(54) A container for transporting a granular or powdery material

(57) The invention relates to a container for transporting a granular or powdery material such as cement, gypsum and the like in dry condition, and to a mixing/metering unit connected to said container for mixing said material with a liquid from an external source to be con-

nected to said mixing/metering unit. The container is provided with memory means, which can be connected to the mixing/metering unit for controlling the mixing/metering unit in such a manner that the material and the liquid are mixed in a predetermined ratio.

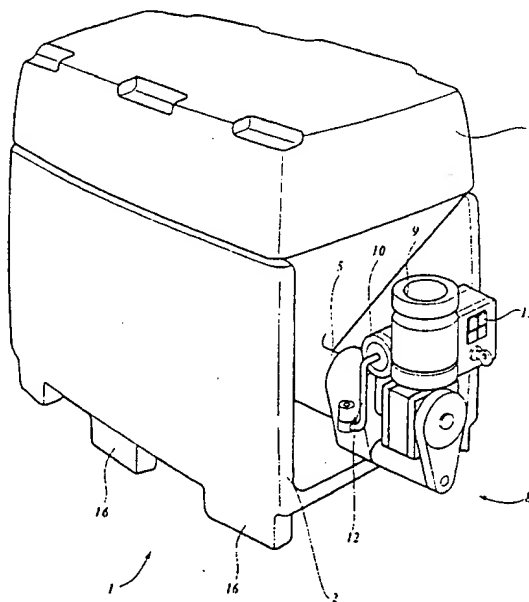


Fig. 1

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Description

The invention relates to a container for transporting a granular or powdery material such as cement, gypsum and the like in dry condition, and to a mixing/metering unit associated with said container for mixing said material with a liquid from an external source to be connected to said mixing/metering unit.

Containers for transporting material in dry condition from the factory where the material is produced, or from the supplier who supplies the material, to a building site are generally known. At the building site the material, for example a binding agent, is mixed with water or another suitable liquid for further processing, for example for laying bricks or glueing bricks together or the like. A problem thereby is the fact that the user is free to regulate how much liquid is mixed with a particular amount of material. In many cases, however, the quality of the material that is mixed with a liquid strongly depends on the amount of liquid that is mixed with a particular amount of material. Consequently an incorrect material/liquid mixing ratio may have an adverse effect on the quality of the eventual work.

On the other hand the manufacturers and/or suppliers of the material are faced with increasingly high demands with regard to the quality of the products they supply. In order to satisfy these demands, however, the manufacturer and/or the supplier will find it necessary to be able to regulate the correct mixing ratio of material and liquid.

According to the invention this can be achieved in a simple manner in that the container is provided with memory means, which can be connected to the mixing/metering unit for controlling the mixing/metering unit in such a manner that the material and the liquid are mixed in a predetermined ratio.

When a container of this type is used the memory means fitted to the container, which may for example comprise a chip or a similar piece of electronic equipment, may be fitted to the container by the manufacturer or the supplier, so that with normal use the customer may be assured that the mixing ratio of material and liquid will be optimal at all times.

The invention will be explained in more detail hereafter with reference to an embodiment of the construction according to the invention diagrammatically illustrated in the accompanying Figures.

Figure 1 is a diagrammatic perspective view of a container according to the invention.

Figure 2 is a diagrammatic cross-sectional view of the container shown in Figure 1.

Figure 3 is a schematic block diagram of the circuit for controlling the means for mixing the material with liquid.

Figure 4 is a diagrammatic perspective view of a trolley by means of which a container according to the invention can be moved.

Figure 5 is a diagrammatic perspective view of the

container disposed on a stand.

The container 1 of the embodiment shown in the Figures comprises a U-shaped frame 2, which accommodates a hopper 3 which is slightly conical in downward direction and which is provided with a filling hole (not shown).

As is furthermore shown in Figure 2, a screw conveyor 4 is provided near the bottom of the hopper, said screw conveyor near its ends being supported by cylindrical projections 5 which are integral with the hopper 3 and which are capable of being closed by means of covers 6.

The screw conveyor 4 may form part of the transportable container, but it will also be possible to transport the container from the manufacturer or supplier to the building site or the like without a screw conveyor being provided, with a screw conveyor 4 being fitted to the hopper 3 by the user at the building site or the like. A coupling means 7 is mounted on the end of the screw conveyor projecting outside the hopper 3, which coupling means functions to connect a mixing/metering unit 8 to the screw conveyor. Said mixing/metering unit is provided with an electromotor 9 for driving the screw conveyor 4 and a mixing mechanism, which is positioned in a mixing chamber of unit 8 and to which material present inside the hopper 3 can be supplied by means of the screw conveyor 4.

The mixing/metering unit is furthermore provided with a fluid pump 10 to be driven by a separate electromotor, which can be connected to a liquid source, for example the water mains, via a pipe 12. During operation a desired amount of liquid may be supplied to the mixing chamber by means of the pump 10.

As is schematically shown in Figure 3, a memory means 13, which may for example be provided with a chip or another suitable piece of electronic equipment, is fitted to the container 1 by the manufacturer or the supplier. Said memory means contains data with regard to the correct mixing ratio of material and liquid. Preferably said memory means is fitted to the container in such manner as to be exchangeable, so that it will be possible to provide the container with a memory means which is adapted to the material present in the container and/or to the intended use of the material.

The mixing/metering unit 8 to be connected to the container is provided with a signal receiver 14, which is connected to the memory means 13 when the mixing/metering unit is being connected to the container. When the mixing/metering unit 8 is put into operation control signals will be supplied to the signal receiver 14 from memory means 13, and appropriate signals will be supplied to motor 9, by means of signal receiver 14, for driving the pump 10 to supply desired amounts of material and liquid to the mixing chamber.

The user will thereby be able to program the metering/mixing unit 8 to deliver the desired amount of material/liquid mixture by means of a keypad 15 which is provided on said metering/mixing unit.

It will be apparent that in this manner a precise regulation of the mixed amounts of dry matter and liquid can be realized, thus making it possible to ensure a desired quality of the product eventually to be processed.

The container can be readily transported with a fork lift truck, since the container is fitted with spaced-apart feet 16 projecting under the U-shaped frame, between which the teeth of the fork lift truck can be inserted.

The outer feet 16 are thereby spaced from the outer edges of the U-shaped frame by some distance, thus making it possible to place bars 17 against the outer feet and the bottom of the U-shaped frame as is shown in Figure 4. Said bars 17 are connected, by means of cable 18, to a bar 19 positioned approximately centrally above the container 1. The trolley 20 shown in Figure 4 may be used for moving the container over the building site or the scaffolding, said trolley being provided with a frame 21 which is supported by three wheels 22, one of which is self-adjusting about an upwardly extending pivot pin. The trolley is thereby fitted with two lifting arms 23 being capable of pivoting movement about a horizontal axis, which lifting arms can be pivoted upwards and downwards by means of a setting cylinder 24. The rod 19 positioned above the container 1 can be coupled to the free ends of the lifting arms 23, so that the container can be suspended in the trolley 20 by means of the lifting arms in the manner shown in Figure 4, and then be moved by means of said trolley.

If it is not necessary for the container 1 to be moved across the building site, it may for example be supported on a stand 25, as is shown in Figure 5.

From the above it will be apparent that by using the container according to the invention the transportation of material between manufacturer or supplier and the customer can be realized in an effective manner without using disposable packaging, whilst the manufacturer/supplier is able to influence the correct mixing ratio of dry material and liquid.

Preferably the metering/mixing unit 8, and possibly also the screw conveyor 4, are connected to the container in such manner as to be readily detachable, so that it will be possible to use a metering/mixing unit 8 and possibly a screw conveyor 4 present at the building site or the like for the various containers which are supplied to the building site.

Claims

1. A container for transporting a granular or powdery material such as cement, gypsum and the like in dry condition, and a mixing/metering unit associated with said container for mixing said material with a liquid from an external source to be connected to said mixing/metering unit, characterized in that the container is provided with memory means, which can be connected to the mixing/metering unit for controlling the mixing/metering unit in such a man-

ner that the material and the liquid are mixed in a predetermined ratio.

2. A container according to claim 1, characterized in that said memory means is fitted to said container in such a manner as to be exchangeable.
3. A container according to claim 1 or 2, characterized in that said mixing/metering unit is coupled to said container in such a manner as to be readily detachable.
4. A container according to any one of the preceding claims, characterized in that said container is near its bottom side provided with a removable screw conveyor, which cooperates with said mixing/metering unit.
5. A container according to any one of the preceding claims, characterized in that said mixing/metering unit is provided with a motor for driving means for supplying a binding agent to a mixing chamber, with mixing means located in said mixing chamber, and with a motor for driving a fluid pump.
6. A container according to any one of the preceding claims, characterized in that said mixing/metering unit is provided with means for programming the amount of mixed material to be delivered.
7. A container according to any one of the preceding claims, characterized in that said container is at its bottom side provided with projecting feet, which are spaced apart in such a manner that the forks of a fork lift truck can be inserted between said feet.
8. A container according to claim 7, characterized in that the outer feet are spaced from the sides of the container by some distance.
9. A container according to any one of the preceding claims, characterized in that said container is provided with a substantially U-shaped frame and with a hopper accommodated within said frame, which hopper is slightly conical in downward direction.
10. A trolley for transporting a container according to any one of the preceding claims, characterized in that said trolley is provided with lifting arms for supporting said container and with setting means for pivoting said lifting arms.

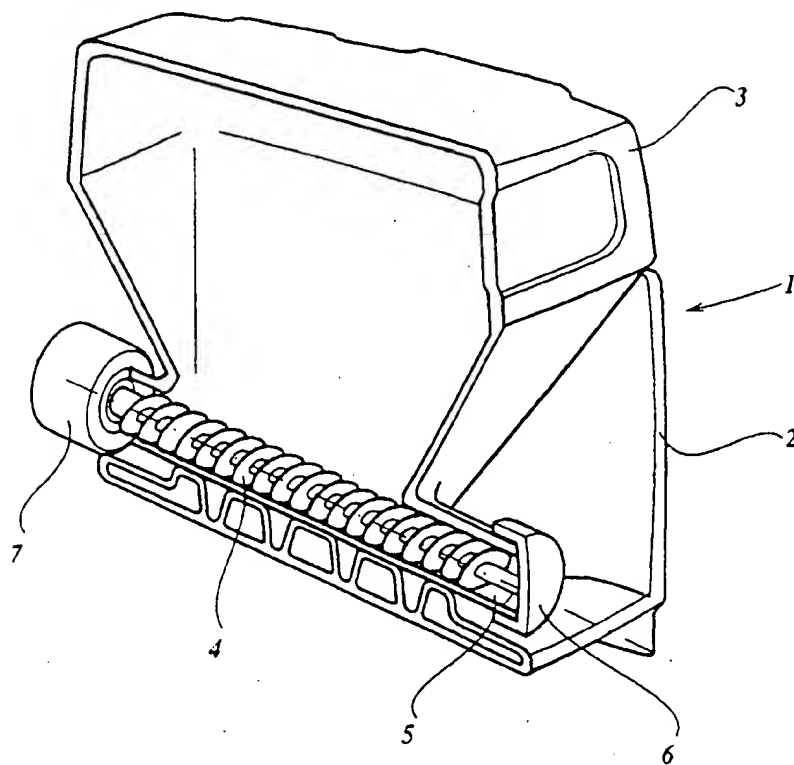


Fig. 2

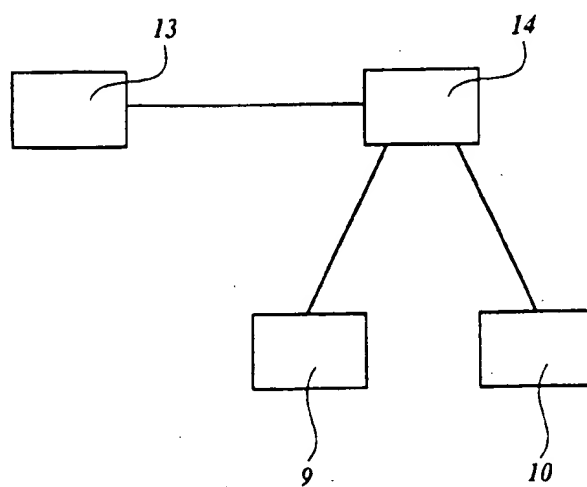


Fig. 3

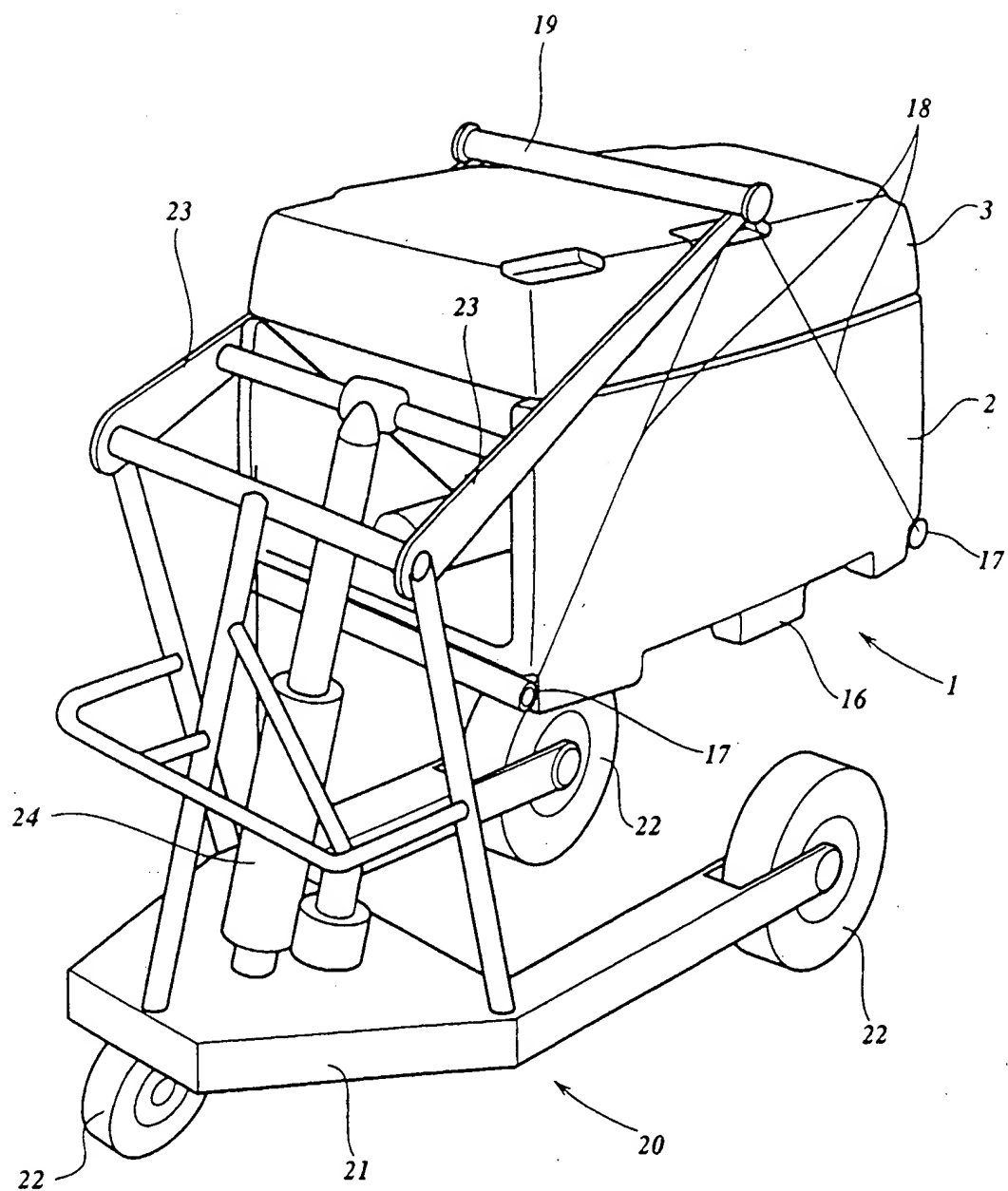


Fig. 4

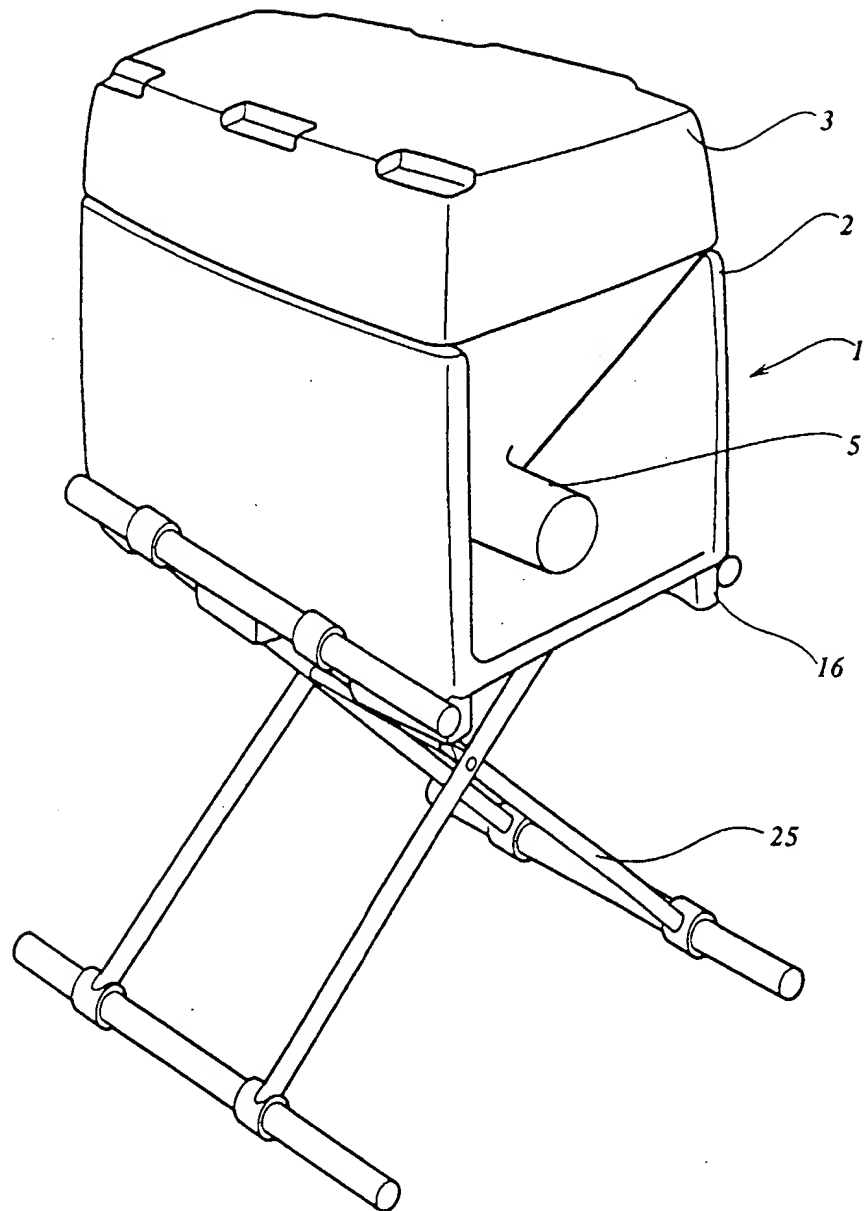


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 96 20 1034

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 199 884 (LJUNG TORSTEN NIKOLAUS) 5 November 1986	1,5,6	B28C7/04
Y	* page 3, line 15 - page 5, line 24; figures 1,2 *	3,4	
Y	DE-U-88 15 361 (TUBAG GMBH) 30 March 1989 * claims; figures *	3,4	
Y	EP-A-0 270 202 (STEPHENS ANTHONY LEON) 8 June 1988 * claims; figures *	1,5,6	
Y	GB-A-2 147 215 (ISHIKAWAJIMA HARIMA HEAVY IND; ISHIKAWAJIMA CONSTR MACH) 9 May 1985 * claims; figure 9 *	1,5,6	
A	DE-U-88 10 499 (MASCHINEN- & APPARATEBAU AUGUST TEPE GMBH) 13 October 1988 * the whole document *	1-10	
A	WO-A-92 19432 (CAMCO UK LIMITED) 12 November 1992 * claims; figures *	1-10	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B28C
A	GB-A-2 158 728 (D & H MATERIALS) 20 November 1985 * abstract; claims *	1-10	
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 694 (M-1531), 17 December 1993 & JP-A-05 237832 (NIKKO CO LTD; OTHERS: 01), 17 September 1993, * abstract *	1	
A	CH-A-413 725 (WIRZ) 15 December 1966 * figures *	7-10	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 August 1996	Examiner Voutsadopoulos, K
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPF FORM 1501018Z (POKCOI)

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Y	GB-A-2 147 215 (ISHIKAWAJIMA HARIMA HEAVY IND; ISHIKAWAJIMA CONSTR MACH) 9 May 1985 * claims; figure 9 *	1,5,6	
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A	WO-A-92 19432 (CAMCO UK LIMITED) 12 November 1992 * claims; figures *	1-10	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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